DOCUMENT RESUME

ED 252 578 TM 850 055

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TITLE Test Anxiety, Previous Test Taking Experience, and Test-Wiseness in Entering Medical Students.
PUB DATE Nov 84
NOTE 14p.; Paper presented at the Annual Meeting of the Mid-South Educational Research Association (13th, New Orleans, LA, November 14-16, 1984).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Essay Tests; Higher Education; *Medical Students; Objective Tests; Performance Factors; Performance Tests; *Student Experience; Test Anxiety; Test Norms; *Test Wiseness

ABSTRACT

The relationships among variables for a group of first year medical students were examined. The variables included previous test-taking experience, test-taking training, test anxiety, and level of test wiseness. The study also provided initial normative data concerning the level of test anxiety among entering medical students for comparison with undergraduate college student norms. Many medical students had had previous test-taking training. A positive correlation was found between experience with essay tests and comfort in taking oral examinations, indicating a relationship between two verbal skill areas. The negative correlation between experience in taking essay tests and comfort in taking objective multiple choice tests may be of practical importance because of the nature of testing in most medical schools. Medical students were less test anxious than undergraduate college students. Some evidence was found that students' test anxiety may be more closely related in a negative manner to their level of comfort in taking objective create-an-answer tests and practical/performance tests. The study failed to support a negative relationship between test anxiety and test wiseness. (DWH)

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Test Anxiety, Previous Test Taking Experience, and Test-Wiseness in Entering Medical Students

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Introduction

This study was designed to examine the relationships among the following variables for a group of medical students just prior to the start of the first year: 1) previous test taking experiences, 2) test taking training, 3) test anxiety 4) level of test-wiseness. The other major objective of the study was to provide initial normative data concerning the level of test anxiety among entering medical students for comparison with undergraduate college student norms.

Review of Literature

This review briefly summarizes some of the literature concerning test anxiety. A second segment deals with some of the literature about test-wiseness; this will be followed by a brief statement concerning some of the literature which brings these two concepts together.

For the purpose of this paper, it is assumed that test anxiety is a situation-specific personality trait. Alpert and Haber (1960) distinguished between two kinds of response to stress, calling them "facilitating" and "debilitating" anxiety. The anxiety of greater concern to instructors is debilitating anxiety since it may result in students performing at levels on tests that are lower than warranted by their knowledge or ability.

Wine (1971) suggested an attentional interpretation of the debilitating effects of test anxiety. The high test-anxious person attends to both self-relevant and task-relevant variables in contrast to the low test-anxious person who attends mostly to task-relevant variables. In other words, the test-anxious person worries during examinations.

Self-oriented, interfering worry responses are only one component of test anxiety-the cognitive component. There is also a physiological, affective component of test anxiety-the emotional component. Liebert and Morris (1967) defined worry as cognitive concerns about the consequences of failure and emotionality as reactions of the autonomic nervous system that are evoked by evaluative stress.

Paul and Eriksen (1964) presented evidence suggesting that test anxiety has little effect on the performance of students who are either high or low in scholastic ability. Since medical students are of relatively high scholastic ability, their performances may not be greatly affected by test anxiety. Spielberger and Katzenmeyer (1959) essentially made the same statement when they found that college students in the middle range of intellectual aptitude were most affected by test anxiety.

TM 850 055

Presented at the 13th Annual Meeting of the Mid-South Educational Research Association, New Orleans, Louisiana, November 15, 1984.

Test anxiety may be a natural reaction resulting from poor study and test-taking skills. If this is so, one would expect that study skills and test-taking skills training would decrease test anxiety and increase grades. Several studies (Allen, 1971, 1973; Horne and Matson, 1977) found study skills training alone to be effective in increasing academic performance. The two studies by Allen show that combinations of desensitization or relaxation and study skills training were effective in both reducing test anxiety and improving grades.

Tryon (1980) has written an excellent review of the literature concerning test anxiety. She has covered the topic in detail; her review deals with the measurement and treatment of test anxiety.

Test-wiseness (TW) has been defined by Millman, Bishop and Ebel (1965) as "a subject's capacity to utilize the characteristics and formats of the test and/or the test taking situation to receive a high score. Test-wiseness is logically independent of the examinee's knowledge of the subject matter for which the items are supposedly measures." Thus, TW is a cognitive ability (or abilities) that one may employ on a variety of tests, regardless of the nature of the tests' content. Some synonyms of TW include (test) insight, testmanship, and test sophistication. While appropriate guessing strategies and appropriate levels of risk taking may be associated with TW, these terms are not necessarily synonymous.

The analysis by Millman et al. (1965) focused on two aspects of test-wise behavior: 1) those independent of test constructor or test purpose, including wise use of time, strategies for avoiding errors, sensible guessing tactics, and the use of deductive reasoning to eliminate incorrect alternatives in multiple-choice tests; and 2) those specific to particular tests or particular examiners. The latter involve recognizing test construction errors and examiner idiosyncracies that can help to "give away" the answer, and "reading the examiner's mind" when the intent of the question is not clear.

Sarnacki (1979) points out in his review of the literature relating to test-wiseness that there are several peripheral factors that may affect one's level of test-wiseness. No doubt the most general is test taking experience. However, mere experience does not necessarily increase TW nor produce a skilled examinee. A second variable is time; test taking skills may be severely eroded with the passage of time. Test-taking experience is also related to test formats. Individuals skilled in dealing with certain test formats or test item types may need to acquire experience with unfamiliar or unique test formats before they can master the TW principles associated with the new test formats.

A number of studies (Bajtelsmit, 1975; Diamond and Evans, 1972; Rowley, 1974) have shown that TW and verbal skills are highly related. This was consistent across a number of measuring devices and populations of subjects.

Logical considerations would suggest a negative correlation between TW and test anxiety. One would expect that examinees must possess a certain amount of composure in taking tests in order to attend to the task-relevant variables of TW cues. Although Millman (1966) found no relationship between test anxiety and TW, Bajtelsmit (1975) found high scores on the A-State score of the State-Trait Anxiety Inventory to be consistent with low scores on his measure of TW, the Test of Obscure Knowledge (TOOK). Since Bajtelsmit (1975) and Jacobs (1975) have both postulated that anxiety may be an affective component of TW, further research on the relationship between these two variables appears to be warranted.

Methods

A week-long orientation program was offered to all interested entering medical students at the East Tennessee State University College of Medicine during the week prior to the start of classes (August 6-10, 1984). Forty-two of the 56 entering students elected to participate. Thirty-eight of those students elected to take a one-half day workshop titled Effective Test Taking. Pretest measures at the start of the workshop were: 1) Test Taking Experience Questionnaire, 2) Test Anxiety Inventory (TAI), 3) Measure of Obscure Medical Information (MOOMI) (Form A).

The first instrument was a one-page questionnaire which asked questions concerning previous test taking training, self-reported general performance on previous standardized tests, and level of exposure to and comfort with various types of tests (objective, essay, performance, etc.) as an undergraduate college student.

The second measure was developed by Spielberger (1980) and yields a total score for test anxiety and subscale scores for worry and emotionality. The TAI was developed to measure test anxiety in high school and college students. It is similar in concept and structure to the A-Trait Scale of the State-Trait Anxiety Inventory (STAI), which measures general anxiety proneness in adolescents and adults (Spielberger, Gorsuch, and Lushene, 1970). Most of the entering students also took the A-Trait Scale of the STAI as a part of another study during the week of the orientation program. Entering students who did not participate in the orientation program were also asked to complete the Test Anxiety Inventory for counseling purposes. Thus, 54 of the 56 students completed this instrument.

The third test is actually a measure of six different aspects of test-wiseness developed by Harvill (1984). The six TW areas are: 1) similar options (all but one of the options are similar in meaning), 2) umbrella term (one of the options is an inclusive term which includes all other options), 3) item give-away (the correct answer to the item is revealed in another test item), 4) convergence principle (two or more options have one factor in common; two or more options have a second factor in common; the test-wise examinee selects the option where the two factors converge), 5) length of correct option (the keyed option is significantly longer than the other options), 6) stem-option cue (there is an obvious resemblance between a word or phrase in the item stem and a word or phrase in an option). The six areas of TW were selected, in part, because each could lead the test-wise examinee to the correct answer and not just assist the examinee in eliminating one or more options. The content for the test items was based on obscure, factual medical information. Each of the two forms (A and B) of the MOOMI contain 24 four-choice multiple-choice items in which the examinee is to select the one best answer. Each form has subtests of four items each for each of the six TW areas. On the basis of a validity study, it was assumed that the items did measure obscure information and that nearly all medical students could only arrive at the correct answers by guessing or by the use of TW cues. Form B of the MOOMI was used as a posttest at the conclusion of the workshop.

The workshop was designed to improve the test taking skills of the students as they started medical school. The workshop covered general principles concerning the preparation for and taking of tests; specific information concerning the types of tests and item formats that are used in the first-year medical school courses; complete descriptions, examples, and hints for responding to all types of multiple-choice item types seen in the first year of the curriculum; and cues and clues to look for in responding to test items. The 38 students were divided into three groups of approximately equal size for the workshop.

The data from the five instruments were analyzed using descriptive statistics, Pearson correlation coefficients and t-tests.

Findings

The first question on the Test Taking Experience Questionnaire asked whether the student took the Kaplan course (or a similar course) in preparation for taking the Medical College Admission Test (MCAT). This course provides an intensive review of the content covered on the test as well as principles of effective test taking. The second question asked if the student had had any other form of training in test taking skills (how to prepare for and take tests). Seventeen of the 37 students who responded indicated that they had taken the Kaplan (or similar) course. Seven students stated that they had had other previous training in test taking skills. Only 14 of the 37 students indicated that they had received no previous training in how to prepare for and take tests.

Students were asked to categorize their performance on standardized tests (ACT, SAT, MCAT, etc.). Nineteen students indicated that their scores are usually below their perception of their general ability level, 17 felt that their scores are usually equivalent to their perception of their general ability level, and only one student said that his/her scores are usually above his/her peception of his/her general ability level.

Students were also asked to use estimated percentages to indicate the various types of tests that they experienced in all of their coursework as undergraduate students. They split their percentages among four categories: 1) objective select-an-answer tests (multiple-choice, true-false, matching), 2) objective create-an-answer tests (short-answer, fill-in-the-blank), 3) essay tests (written responses of at least a paragraph), 4) other tests (orals, practicals, performance, etc.). Student responses to this question are given in Table 1. It is obvious that students have had varying experience with different types of test formats as they enter medical school. Of the 35 students which responded, 10 of them indicated that 50 percent or more of their tests had been of the objective select-an-answer type, five stated that 50 percent or more of their tests were of the objective create-an-answer type, and six indicated that 50 percent or more of their tests were essay tests.

Table 1

Descriptive Statistics for the Estimated Percentages of and Level of Comfort in Taking various Types of Tests Experienced by Entering Medical Students (N=35) during their Undergraduate Coursework

Estimated Percentages of Various Types of Tests	Mean	SD	Median	Range
Objective select-an-answer tests (%)	35.9	18.3	35.0	2 to 70
Objective create-an-answer tests (%)	28.6	14.7	25.4	0 to 75
Essay tests (%)	27.7	21.5	19.8	5 to 98
Other tests (%)	7.9	6.2	5.5	0 to 25

Level of Comfort in Taking Various Types of Tests	Mean*	SD	Median	Range
Objective select-an-answer	4.0	1.1	4.2	1 to 5
Objective create-an-answer	3.5	0.8	3.5	2 to 5
Essay	3.7	1.1	3.8	1 to 5
Oral	3.0	1.1	3.0	1 to 5
Practical/performance	3.5	1.0	3.5	1 to 5

*1=Very Uncomfortable, 5=Very Comfortable

Students were also asked to indicate their level of comfort in taking each of the following types of tests: 1) objective select-an-answer tests, 2) objective create-an-answer tests, 3) essay tests, 4) oral tests, 5) practical/performance tests. The scale for responding ranged from 1 (very uncomfortable) to 5 (very comfortable). The mean, standard deviation, median and range of their responses for each type of test are given in Table 1. As a group, they seem to be most comfortable with multiple-choice, true-false, and/or matching tests and least comfortable with oral examinations.

Correlations between the relative level of experience with and the level of comfort in taking various types of tests are shown in Table 2. One might expect positive correlations in the diagonal and negative correlations in the off-diagonal positions. Those correlations which are statistically significant follow that pattern except for the positive correlation between Experience with Essay Tests and Comfort in taking Oral Tests. The other significant correlations would indicate some relationship between level of experience and level of comfort.

Table 2

Pearson Product-Moment Correlations between the Level of Experience with and the Level of Comfort in taking various Types of Tests (N=35)

Level of comfort in taking tests that are	Estimated percentage of undergraduate tests that were: Objective select-an-answer	Objective create-an-answer	Essay	Other
Objective select-an-answer	.29	.17	-.39*	.13
Objective create-an-answer	-.08	.08	.02	-.04
Essay	-.30	.04	.34*	-.39*
Oral	-.40*	.00	.36*	-.06
Practical/performance	-.27	.18	.13	-.09

*Significant at $p < .05$

Table 3 contains the means and standard deviations for females, males, and the total group on the emotionality and worry subtests and the total score on the Test Anxiety Inventory (TAI). The table also contains means and standard deviations for the college undergraduate norm sample of 795 females and 654 males provided in the test manual for comparison purposes. The medical students express less test anxiety than the college undergraduate students. In fact, in comparing the medical student values with the college student norms, the medical student mean values were significantly lower ($p < .05$) than the college student means. Only four of the 21 female medical students had Emotionality scores above the female college student mean score; only one female medical student had a Worry score above the female college student mean score. Among the 33 male medical students, five had Emotionality scores, three had Worry scores, and three had Total TAI scores above the comparable male college student mean scores. It is also interesting to note that there was less variability in the scores of the medical students when compared with the college student norms.

Table 3

Means and Standard Deviations for the Test Anxiety Inventory for Medical Students and College Undergraduate Students

	Emotionality		Worry		Total Score	
	Mean	SD	Mean	SD	Mean	SD
Medical Students						
Females (N=21)	14.8	3.5	10.5	2.1	32.1	6.4
Males (N=33)	14.9	4.4	11.0	2.7	32.8	8.1
Total (N=54)	14.8	4.0	10.8	2.5	32.5	7.4
College Students						
Females (N=795)	18.9	6.3	14.9	5.5	42.8	13.7
Males (N=654)	16.9	5.6	13.6	5.0	38.5	12.4

Most of the entering students completed the A-Trait Scale of the State-Trait Anxiety Inventory (STAI) as well. This is a measure of general anxiety proneness in adolescents and adults. The correlations between the scores on the TAI and the A-Trait Scale of the STAI for males and females are presented in Table 4. It is clear that there is some degree of relationship between self-reported levels of general anxiety and test anxiety for medical students with the percentage of shared or explained variance generally around 25 to 30 percent.

The data from the two administrations of the TW examinations as a pretest and a posttest with the workshop intervening are presented in Table 5. The 35 students who took both tests started the experience with good ability to use the stem-option, give-away, and umbrella term cues with mean pretest scores all greater than 70 percent. Their ability to perceive and use the similar option and length cues was not as good with mean percentage scores of 51.5 and 43.0, respectively. The mean score of 27.8 percent on the pretest convergence items indicates that they were operating

at the chance level as a group. The students showed significant gains from pretest to posttest on five of the six subtests and on the total score. The mean gain score was 6.71 raw score points or 28 percentage points.

Table 4

Pearson Product-Moment Correlations among the Emotionality, Worry, and Total Scores from the Test Anxiety Inventory and the A-Trait Score from the State-Trait Anxiety Inventory for Male and Female Medical Students

	Emotionality	Worry	Total Score
A-Trait, STAI			
Males (N=31)	.42*	.55*	.55*
Females (N=15)	.54*	.24	.58*

*Significant at $p < .05$

Table 5

Pretest and posttest means, standard deviations, changes, and correlations for the subtest and total test scores for the Measure of Obscure Medical Information (N=35)

	Pretest (Form A)		Posttest (Form B)		Change		Pretest/ Posttest Correlation	t value
	Mean	SD	Mean	SD	Mean	SD		
Similar Options	2.06	1.16	3.60	0.81	1.54	1.34	.12	6.73*
Umbrella Term	2.86	0.97	3.89	0.32	1.03	0.95	.23	6.29*
Give-Aways	3.14	0.91	3.60	0.77	0.46	0.98	.33	2.72*
Convergence	1.11	0.87	2.74	0.89	1.63	1.24	.00	7.67*
Length	1.72	1.23	3.83	0.57	2.11	1.39	-.07	8.88*
Stem-Option Cue	3.14	0.77	3.08	0.89	-0.06	1.06	.20	-0.32
TOTAL TEST	14.03	3.20	20.74	2.54	6.71	3.20	.40	12.25*

*Significant at $p < .05$

Table 6 presents some of the correlations among the scores from the TAI, the A-Trait score from the STAI, the pretest and gain scores from the TW measure (MOOMI) and the level of experience with and comfort in taking various types of tests. The first section of the table shows that there are no significant correlations between experience with the various types of tests and all of the other variables. Two correlations with p values between .05 and .10 are worth noting, however. There is a

correlation of -.29 between experience with objective select-an-answer tests and the initial TW score and of .34 between experience with other tests (oral, practical, performance, etc.) and the initial TW score. These correlations suggest that a greater breadth of test taking experiences may enhance TW.

Table 6

Pearson Product-Moment Correlations among the scores from the Test Anxiety Inventory, the A-Trait Score from the State-Trait Anxiety Inventory, the pretest and gain scores from the Measure of Obscure Medical Information, and the Level of Experience with and Comfort in taking various types of tests

	TAI			STAI	MOOMI	
	Emotionality	Worry	Total Score	Trait	Pretest	Gain Score
Estimated percentage of undergraduate tests that were (N=35)						
Objective select-an-answer	.12	.16	.15	.08	-.29	.18
Objective create-an-answer	-.15	-.16	-.14	-.21	-.06	-.07
Essay	-.01	.04	.01	.01	.19	-.04
Other	-.03	-.23	-.15	.19	.34	-.18
Level of comfort in taking tests that are (N=37)						
Objective select-an-answer	-.20	-.11	-.17	-.23	.05	.03
Objective create-an-answer	-.42*	-.11	-.33*	-.33*	.04	.13
Essay	-.07	.10	.01	-.10	-.28	.26
Oral	-.30	-.13	-.27	-.20	-.06	.09
Practical/performance	-.35*	-.46*	-.44*	-.46*	.05	.06
STAI, Trait Anxiety	.44*	.45*	.53*	-	.10	-.24
MOOMI, Pretest	.15	.10	.17	.10	-	-.69*
MOOMI, Gain score	-.03	.06	-.02	-.24	-.69*	-

*Significant at $p < .05$

Since the student's level of comfort in taking various types of tests is probably conceptually related to the measurement of test anxiety, it is not surprising to see that nearly all of the correlations between level of comfort and level of anxiety are negative; seven of those negative correlations are statistically significant. Three of those significant correlations are for the level of comfort in taking objective create-an-answer tests and four of them are for practical/performance tests.

The levels of comfort in taking various types of tests are not significantly correlated with the initial measure of TW or with TW gain. It is interesting to note, however, that the correlation between level of comfort in taking essay tests with the initial TW score was -.28 (p=.11) and .26 (p=.13) with the TW gain score. The TW measure consists entirely of multiple-choice items.

The TAI scores correlate significantly with the A-Trait score from the STAI. These correlations are consistent with the correlations reported for males and females in Table 4.

The initial TW measure has a positive, but not statistically significant, correlation with all four measures of anxiety. The initial TW score does show a statistically significant negative correlation with TW gain score as would be expected. There is no correlation between TW gain scores and the test anxiety scores.

Students were categorized as making small gains (1 to 5 raw score points), moderate gains (6 or 7 points), or large gains (8 to 15 points) from the pretest to the posttest on the measures for TW. The nine students making small gains were compared to the nine students making large gains on a number of variables. Students making small gains reported less relative experience with objective select-an-answer tests (30.6% to 39.2%) and more relative experience with essay tests (26.1% to 23.3%). They indicated less comfort in taking objective select-an-answer (3.89 to 4.00) and essay tests (3.56 to 4.11) and expressed greater test anxiety on both subtest scores and the total score (33.2 to 30.9). The students making small gains also had higher scores (33.9 to 27.6) for the A-Trait scale of the STAI; they had higher general anxiety. However, none of these differences were statistically significant. A further look at these relationships with a larger sample would seem worthwhile.

Discussion

The study is based upon data from one entering class at a single medical school. Although some generalizations will be presented, the reader must be very cautious at this point in time with these statements.

Many of the entering students had had previous test taking training. Although there were no apparent differences between those students who did have prior training and those who did not in terms of test anxiety scores or initial TW scores, previous training in test taking skills may be an important element in looking at the relationships in this study.

Students enter medical school with varied backgrounds in terms of the types of tests they have experienced as undergraduates. This variation is due in part to the types of undergraduate institutions which they attended. This, in turn, introduces a number of other background variables which may underlie the measure

of test taking experience. The types of tests experienced by the entering students is also probably a function of the major and/or minor in undergraduate school. All of these variables could impact upon both test anxiety and test-wiseness.

Generally speaking, there is a relationship between the types of tests experienced by the entering students and the level of comfort in dealing with those same types of tests. Two of the reported correlations will be discussed here. The correlation of .34 between experience with essay tests and comfort in taking oral examinations indicates a relationship between two verbal skill areas. Although students indicate little experience in taking oral examinations, their relationship to essay tests in terms of the verbal skills required may help them feel more comfortable in this type of testing situation. The correlation of -.39 between experience in taking essay tests and comfort in taking objective select-an-answer tests may be of practical importance because of the nature of testing in most medical schools. Most of the examinations during the first two years of most medical schools are objective in nature and, more specifically, made up primarily of multiple-choice items. It may be helpful to seek out those entering students whose predominant test taking experience in college has been writing essays for initial encouragement and instruction concerning test taking early in the first year of medical school.

Medical students do not appear to be as test anxious as undergraduate college students. Perhaps the college students with higher test anxiety do not attempt to enter medical school or are rejected in their attempts. Generally speaking, the students who are admitted to medical school have achieved higher grades and higher admission test scores than those who are not admitted. This finding of lower test anxiety among medical students seems consistent with the findings of Paul and Eriksen (1964) and Spielberger and Katzenmeyer (1959) that test anxiety has less effect on the performance of students who are high in scholastic ability.

The finding of moderate positive correlations between the scores on the Test Anxiety Inventory and the measure of general anxiety from the State-Trait Anxiety Inventory seems very logical. Although test anxiety may be a situation-specific personality trait, it may also be only a part of a larger picture of general anxiety for medical students.

Entering medical students have the ability to use several test-wiseness principles effectively and can generally be considered test-wise. Two of the three TW cues (give-aways and umbrella term) which they were able to use effectively prior to training deal with deductive reasoning strategies and are independent of the test constructor according to Millman et al. (1965). The similar options cue would fit in that category as well. They were generally able to use deductive reasoning in taking tests. Performance on the subtests for the length and convergence cues was lower. Appropriate use of both of these TW principles, along with the stem-option cue, seems to be more dependent upon the intent and the item-writing skill of the item constructor. Items susceptible to effective use of the convergence principle are the result of a particular approach to writing distractors. This approach involves determining the correct response first and then determining two characteristics of that response. Incorrect responses are generated by finding other instances of each of those characteristics (but not both in the same incorrect option). The test-wise student can use his/her deductive reasoning ability on this type of item <u>if</u> he/she is aware that the item writer uses this approach to write test items.

Entering medical students were better able to recognize and respond to TW cues after the test taking skills workshop. After being taught the TW principles of convergence and length of keyed option, workshop participants were able to show statistically significant gains. However, the mean score on the convergence subtest after this instruction was still only 2.74 (68.5%) while the mean percentage score on the remainder of the items on the posttest was 90.0 percent.

Harvill (1984) found similar results in terms of initial TW ability and gain scores after instruction. The effect of the instruction concerning test taking skills on course examinations or licensing examinations has not been determined to date. Research on the long-term effects of training in test taking skills is being conducted with medical and nursing students.

There appears to be little relation between experience with various types of tests and the measures of anxiety and test-wiseness. This, of course, does not speak to the total amount or breadth of test-taking experience and how that relates to test anxiety or test-wiseness. Anecdotally, comparisons were made between the 10 students who had experienced 50 percent or more objective select-an-answer tests and the six students who had experienced 50 percent or more essay tests. There were no statistically significant differences between these two groups on the test anxiety measures; the mean scores for the TAI total score were similar (35.4 and 33.7, respectively). There was a statistically significant difference ($p < .05$) in the initial TW scores for these two groups. The group which predominantly took essay tests scored at a higher level than did the other group. The mean score for the predominantly essay test group was 16.0 (66.7%); the mean score for the other group was 12.1 (50.4%). No attempt will be made to explain this bit of information because so many factors (verbal skill, type of major, type of undergraduate institution, previous test-taking training, etc.) could be interrelated.

There does appear to be some evidence that students' test anxiety may be more closely related (in a negative fashion) to their level of comfort in taking objective create-an-answer tests and practical/performance tests. This study provides no evidence for a postulated negative relationship between test anxiety and test-wiseness (Bajtelsmit, 1975; Jacobs, 1975).

References

Allen, G.J. Effectiveness of study counseling and desensitization in alleviating test anxiety in college students. Journal of Abnormal Psychology, 1971, 77, 282-289.

Allen, G.J. Treatment of test anxiety by group-administered and self-administered relaxation and study counseling. Behavior Therapy, 1973, 4, 349-360.

Alpert, R., and Haber, R.N. Anxiety in academic achievement situations. Journal of Abnormal and Social Psychology, 1960, 61, 207-215.

Bajtelsmit, J.W Development and validation of an adult measure of secondary cue-using strategies on objective examinations: The test of obscure knowledge (TOOK). Paper presented at the annual meeting of the Northeastern Educational Research Association, Ellenville, New York, October, 1975.

Diamond, J.J. and Evans, W.J. An investigation of the cognitive correlates of test-wiseness. Journal of Educational Measurement, 1972, 9, 145-150.

Horne, A.M. and Matson, J.L. A comparison of modeling, desensitization, flooding, study skills, and control groups for reducing test anxiety. Behavior Therapy, 1977, 8, 1-8.

Harvill, L.M. Measuring the test-wiseness of medical students. Paper presented at a joint session of the annual meetings of the National Council on Measurement in Education and the American Educational Research Association, New Orleans, Louisiana, April, 1984.

Jacobs, S.S. Test-wiseness: Several methodological problems. Paper presented at the annual meeting of the National Council on Measurement in Education, Washington, D.C., April, 1975.

Liebert, R.M. and Morris, L.W. Cognitive and emotional components of test anxiety: A distinction and some initial data. Psychological Reports, 1967, 20, 975-978.

Millman, J. Test-wiseness in taking objective achievement and aptitude examinations. Final Report, 1966, College Entrance Examination Board.

Millman, J., Bishop, C.H., and Ebel, R. An analysis of test-wiseness. Educational and Psychological Measurement, 1965, 25, 707-726.

Paul, G.L. and Eriksen, C.W. Effects of test anxiety on "real-life" examinations. Journal of Personality, 1964, 32, 430-494.

Rowley, G.L. Which examinees are favored by the use of multiple-choice tests? Journal of Educational Measurement, 1974, 11, 15-23.

Sarnacki, R.E. An examination of test-wiseness in the cognitive test domain. Review of Educational Research, 1979, 49, 252-279.

Spielberger, C.D. Test Anxiety Inventory, Preliminary Professional Manual. 1980, Consulting Psychologists Press.

Spielberger, C.D. and Katzenmeyer, W.G. Manifest anxiety, intelligence, and college grades. Journal of Consulting Psychology, 1959, 23, 278.

Spielberger, C.D., Gorsuch, R.L., and Lushene, R.E. Manual for the State-Trait Anxiety Inventory, 1970, Consulting Psychologists Press.

Tryon, G.S. The measurement and treatment of test anxiety. Review of Educational Research, 1980, 50, 343-372.

Wine, J. Test anxiety and direction of attention. Psychological Bulletin, 1971, 76, 92-104.